

In re Appln of Alexander FINKELSTEIN et al
Appln. No. 10/585,582
Reply dated April 1, 2010
Reply to Office Action of October 2, 2009

REMARKS

The Official Action of October 2, 2009, and the prior art relied upon therein have been carefully studied. The claims in the application are now claims 1, 3-13, 23, 24, 26-28, 30-48 and 50-55, and these claims define patentable subject matter warranting their allowance. Favorable reconsideration and allowance are earnestly solicited.

Withdrawn claim 56 has now been deleted without prejudice to Applicants' rights, including those rights provided by §§121 and 120.

Claim 38 has been objected to, and correction has been required. The objection is respectfully traversed.

Claim 38 has been amended to place it in better form for U.S. practice, the objectionable language "a lens-like geometry" having been deleted from claim 38.

Withdrawal of the rejection is in order and is respectfully requested.

To clarify the record, Applicants have not claimed foreign priority, but have claimed the benefit of U.S. provisional Application No. 60/534,708 filed January 8, 2004. The present application is the U.S. National Phase of PCT/IL2005/000026, filed in English on January 9, 2005.

Claims 1, 3-11, 26-28, 30, 36, 50 and 51 have been rejected under §102 as anticipated by Chen et al, "Spin-polarized reflection of electrons in a two-dimensional electron system," Reference U, hereinafter simply "Chen." This rejection is respectfully traversed.

Chen relates to the creation of spin-polarized beams of ballistic electrons in a two-dimensional electron system in the presence of spin-orbit interaction (SOI). As illustrated in the upper panels of Fig. 1 of Chen, a beam of two-dimensional electrons in a heterostructure is injected towards a barrier. In the presence of SOI, scattering off the barrier leads to spin-flip events, and results in different reflection angles for different spin polarizations. The spin-polarized reflected beams can then be captured through suitably positioned apertures (upper left panel in Fig. 1) of Chen.

The present invention on the other hand calls for a device comprising a structure containing a two-dimensional gas of the current carriers configured to create at least one region of inhomogeneity in the form of a transition region between two regions of the gas characterized by a substantially varying value of at least one parameter selected from a spin-orbit coupling constant, density of the spin carrying current carriers, the region of inhomogeneity presenting or forming a lateral interface with laterally varying parameters between the two gas regions.

The lithographic barrier of Chen cannot be considered to properly read on Applicants' region of inhomogeneity, i.e. Applicants' region of inhomogeneity cannot be interpreted as the lithographic barrier of Chen because the barrier of Chen is a

structural element (static region having a given shape) having parameters defined in the manufacturing stage (by etching) and therefore cannot have any substantially varying value between the two gas regions.

According to the present invention, the injection of the current (directional motion of current carriers) from one region to the other region through the interface results in a change in the direction of motion of the current carriers. The barrier of Chen cannot allow the passage of the current into the region inside the barrier. As such, the barrier of Chen cannot be interpreted as a lateral interface with laterally varying parameters between the two regions of the electron gas. In other words, the barrier of Chen separates a region with gas from an area without gas. Even more, the lithographic barrier is a region without gas and operates as a gas barrier.

Moreover, the device of the present invention (termed "spintronic device") is operable to perform spin manipulations of the input current to provide at least one of the following types of deviation of the spin carriers: spin dependent refraction, spin dependent reflection and spin dependent diffraction on desired deviation angles of a direction of motion of the spin carriers being incident on the region of inhomogeneity. The barrier of Chen being a reflecting barrier, provides that only a spin dependent reflection can be obtained.

It is clear that Chen does not disclose each and every feature of Applicants' claim 1 (and therefore each and every feature of every claim which depends from and incorporates the subject matter of claim 1), and therefore Chen does not

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anticipate claim 1 or any of Applicants' claims which depend from claim 1.

Withdrawal of the rejection is therefore in order and is respectfully requested.

Chen has correctly not been applied against claim 1 under 35 CFR §103. Applicants agree that there is nothing in Chen or elsewhere, insofar as is known, which would have made it obvious to modify Chen in such a way as to correspond with what is called for in Applicants' claim 1, as explained above.

Claims 50 and 51 similarly define novel and non-obvious subject matter over Chen for the same reasons as pointed out above with respect to claim 1. Accordingly, withdrawal of the rejection of claims 50 and 51 over Chen is respectfully requested for the reasons set forth above.

Applicants have not at this time separately argued the patentability over Chen of any of the claims dependent on claim 1, but Applicants respectfully reserve the right to do so at a later time if same turns out later to be necessary or desirable.

Claim 54 has been rejected under 35 USC §102 as anticipated by Kiselev et al, "T-shaped spin filter with a ring resonator," Reference AR, hereinafter simply "Kiselev." This rejection is respectfully traversed.

Kiselev suffers from much the same differences from the present invention as does Chen, as explained above. Thus, the T-shaped structure of Kiselev cannot properly be read on Applicants' region of inhomogeneity, i.e. Applicants region of inhomogeneity cannot be interpreted as the T-shaped structure of Kiselev because (similar to the barrier of Chen) the T-shaped structure is a structural element (static region having a given T-shape) having parameters defined in the manufacturing stage and therefore incapable of having any substantially varying value.

Moreover, the structure of the present invention is configured to provide a desired orientation between an input flux of spin-carrying current carriers and the region of inhomogeneity.

The structure of Kiselev is operable as a filter and cannot manipulate the direction of motion of current carriers. Any orientation between the input flux of spin-carrying current carriers and the region of inhomogeneity cannot be provided because the structure does not have any varying parameters that can be adjusted during the filtering procedure.

Withdrawal of the rejection is in order and is respectfully requested.

Claims 12, 13, 23, 24, 40-42, 48 and 53 have been rejected under 35 USC §103 as obvious from Chen in view of Kiselev. This rejection is respectfully traversed.

As pointed out above, both Chen and Kiselev provide devices which basically lack the same feature as compared with

the present invention. Therefore, even if it were obvious (respectfully not conceded) to somehow modify Chen by a feature of Kiselev, thereby providing a modified Chen, such modified Chen could and would still not correspond to any of the rejected claims.

Withdrawal of the rejection is in order and is respectfully requested.

Claim 55 has not been included in the statement of the rejection appearing at the beginning of paragraph 8 on page 8 of the Office Action. On the other hand, claim 55 is addressed in paragraph (h) at page 12 as if it were intended to have been included in the statement of the rejection. Consequently, the rejection of claim 55, which seems to have been intended, based on Chen in view of Kiselev, is respectfully traversed for the same reasons as mentioned above with respect to claim 53.

Claims 53 and 55 have been amended in a way similar to independent claim 1. Both Chen and Kiselev have a static structure predetermined by fabrication. As such, they cannot provide a switch device as called for in claim 55, regardless of how they might be combined. In view thereof, and in view of the arguments made above with respect to claim 1, claims 53 and 55 define non-obvious subject matter over Chen in view of Kiselev.

Withdrawal of the rejection is in order and is respectfully requested.

Claims 43 and 46 have been rejected as obvious under 35 USC §103 from Chen in view of Kiselev and further in view of Kaneyama US 2001/0010358 (Kaneyama). Claim 47 has been rejected

as obvious under §103 from Chen in view of Kiselev and further in view of Kaneyama and Miyata U.S. Patent No. 5,001,437 (Miyata). Claims 38, 39 and 45 have been rejected as obvious under §103 from Chen in view of Kiselev and further in view of Kaneyama. These rejections are all respectfully traversed for reasons as explained above, respectfully repeated by reference.

Regardless of the features which may or may not have been disclosed by and/or made obvious by Kaneyama and Miyata, all the rejections are based on the alleged obviousness of the combination of Chen in view of Kiselev. But, as pointed out above, both Chen and Kiselev have static structures predetermined by fabrication, and such a proposed combination of Chen in view of Kiselev does not reach even claim 1, let alone claims 43, 46, 47, or claims 38, 39 and 45, all of which incorporate the subject matter of claim 1.

In this regard, neither Kaneyama nor Miyata have been cited to make up for the deficiencies of the proposed combination of Chen in view of Kiselev, and indeed do not do so. Therefore, even if it were obvious to further modify Chen in view of Kaneyama and/or Miyata to reach certain features of the subsidiary parts of the rejected claims, the proposed combination still would not have made obvious such dependent claims by virtue of their incorporation of claim 1.

Accordingly, withdrawal of these rejections is in order and is respectfully requested.

Claims 31 has been rejected as obvious under 35 USC §103 from Chen in view of Katoh et al U.S. Patent No. 6,333,516 (Katoh). This rejection is respectfully traversed.

Katoh has not been cited to make up for the deficiencies of Chen as pointed out above, and indeed does not do so. Therefore, even if the combination were obvious, respectfully not conceded, Chen as modified by Katoh would still suffer from the same deficiencies as pointed out above in reply to the rejection of claim 1 based on Chen, because claim 31 depends ultimately from claim 1 and incorporates the subject matter thereof.

Withdrawal of the rejection is in order and is respectfully requested.

Claim 32 has not been included in the stated rejection of claim 31 in paragraph 11 at the bottom of page 14 of the Office Action, but was apparently intended to be included based on paragraph (b) on page 15. The rejection is respectfully traversed insofar as it was intended to be applied to claim 32, for the same reasons as pointed out above with respect to claim 31.

Withdrawal of the rejection is in order and is respectfully requested.

Claim 37 has been rejected as obvious under 35 USC §103 from Chen alone. This rejection is respectfully traversed.

Claim 37 depends from and incorporates the subject matter of claim 36 which in turn depends from and incorporates the subject matter of claim 1. Accordingly, claim 37 defines non-obvious subject matter over Chen for the same reasons as do claims 1 and 36. In this regard, and as indicated above, there is nothing in Chen which would have made it obvious to modify

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Chen in such a way as to achieve the subject matter of claim 1,
which is incorporated into claim 37.

Withdrawal of the rejection is in order and is
respectfully requested.

The prior art documents of record and not relied upon
by the PTO have been noted, along with the implication that such
documents are deemed by the PTO to be insufficiently material to
warrant their application against any of Applicants' claims.

Applicants believe that all issues raised in the
Official Action have been addressed above in a manner that should
lead to patentability of the present application. Favorable
consideration and early formal allowance are respectfully
requested.

If the Examiner has any questions or suggestions, he
is respectfully requested to contact the undersigned at (202)
628-5197.

Respectfully submitted,
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